Washington Hospital Center
MedStar Health

A Guide to the Diagnosis and Management of Category A Bioterrorism Agents ("BE PAST")

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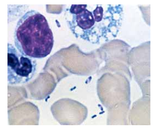
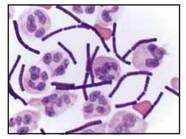
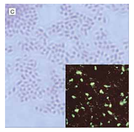
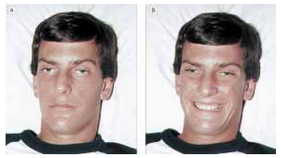
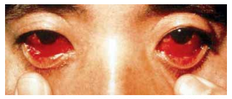
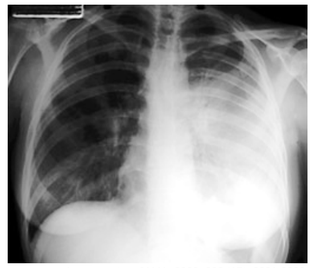
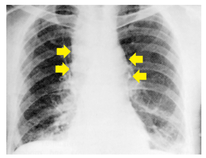
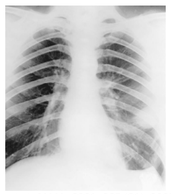
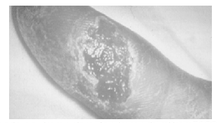
www.BEPAST.org

	Botulism	Ebola and >10 other Viral Hemorrhagic Fevers (VHF)		Plague	Anthrax	Smallpox	Tularemia
Microbiology	*Clostridium botulinum.* Gram positive bacillus bacteria producing a neurotoxin. Foodborne or aerosolized.	Ebola virus. An RNA Filovirus.	Marburg virus. An RNA Filovirus.	Lassa fever virus. An RNA Arenavirus.	*Yersinia pestis.* Gram negative bacteria with "safety pin" staining by Giemsa or Wayson  www.cdc.gov/ncidod/dvbid/plague/p1.htm	*Bacillus anthracis.* Gram positive bacteria that are very long "bamboo" or "boxcar" shaped rods  Bush et al. NEJM. 2001; 345: 1607-10	"Variola" is a DNA virus that causes smallpox. Variola is never in the vaccine. "Vaccinia" is a related virus that is used as a live virus in the smallpox vaccine. Thus, the vaccine cannot cause smallpox.	*Francisella tularensis.* Gram negative bacteria difficult to see on gram stain. Refer for fluorescent antibody stain.  Dennis et al. JAMA. 2001; 285 (21): 2663-2673
Precautions	Standard. No person-to-person spread by air.	Contact and airborne isolation. Fit-tested N-95 (TB) mask, or powered air-purifying respirator (PAPR) if available. Negative pressure room.	Same as Ebola and Lassa viruses, including eye protection.	Same as Ebola and Marburg viruses. Transmission within hospitals documented.	Respiratory droplet isolation so surgical mask blocks spread. (N-95 mask not required, but is also protective). Place masks on patients, HCWs, and other close contacts. Trace/monitor contacts for cough/fever.	Standard. No person-to-person spread by air. Inglesby et al. JAMA. 2002; 287: 2236-2252	Contact and airborne isolation. Immediate N-95 (TB) mask on patient and place in negative pressure room. Medical workers need immediate N-95 (or N-100 or PAPR). Track and vaccinate all contacts and contacts of contacts.	Standard. No person-to-person spread by air.
Clinical Features	Incubation period: 1-8 days. Symmetric, descending flaccid paralysis, Cranial neuropathies (see photo with ptosis and 7th nerve palsy), Respiratory failure. Check gag & vital capacity.  Arnon et al. JAMA. 2001; 285 (8): 1059-1070 4 D's: Diplopia Dysarthria Dysphonia Dysphagia  **VENTILATORS NEEDED!**	Incubation period: 2-21 days. Early: Red eyes, Maculopapular rash, fever. Late: Bleeding, Shock.  Borio et al. JAMA. 2002; 287 (18): 2391-2405 Hemorrhagic conjunctivitis can ocur with any of the VHFs such as Ebola, Marburg, Lassa, or Machupo.	Incubation period: 2-14 days. Findings similar to Ebola with diffuse maculopapular rash, high fever, myalgias, dissemi-nated intravascular coagulation (DIC). JAMA. 2002; 287 (18): 2391-2405	Incubation period: 3-16 days. Early: gradual on-set of fever, retrosternal chest pain, pharyngitis, abdominal pain, then later upper body edema, pleu-ral and pericardial effusions. Borio et al. JAMA. 2002; 287: 2391-2405 Check hepatic enzymes (SGOT > 150 IU/L = worse prognosis) CJ Peters. Principles & Practice of ID textbook. 5th Ed.2000. p.1859.	Incubation period: 1-6 days. Fever, cough, chest pain, hemoptysis then respiratory failure & shock.  Inglesby et al. JAMA. 2000; 283 (17): 2281-2290 Mortality can be very high if Rx not begun until 24 hours of pneumonia symptoms. Thus, may need to start Rx BEFORE final Dx is proven. Can have rash due to DIC or necrosis of extremities ("black death").	Incubation: 2-43 days (Russia, 1979). (Monkeys: rarely spore(s) seen up to 98 days). Inhalation: "Flu"/Dyspnea/nausea. Mediastinal/hilar nodes (see yellow arrows on CXR). Later: Meningitis and/or shock.  Inglesby et al. JAMA. 1999; 281 (18): 1735-1745 Cutaneous: Painless and pruritic. Papular, then vesicular, then black eschar in 7-10 days  Roche KJ et al. NEJM. 2001; 345: 1611 GI: oropharyngeal lesions, bloody diarrhea and vomiting, shock.	Incubation: 7-17 days. Three (3) Major Criteria: 1) Febrile Prodrome: 1-4 days before rash onset, fever >101F and one of following: prostration, headache, backache, chills, vomiting or abdominal pain. 2) Classic Lesions: deep-seated firm, round vesicles or pustules, may have umbilication or confluence. 3) All Lesions in Same Stage of Development: on face first, palms, soles, arms then trunk. Reference: See the CDC rash DDx algorithm: www.bt.cdc.gov/agent/smallpox/diagnosis/pdf/spox-poster-full.pdf  www.who.int/emc/diseases/smallpox	Incubation: 2-10 days. Early: Acute febrile illness, pharngitis, bronchiolitis, pneumonitis, pleuritis, hilar lymphadenitis. Late: Shock. Other forms include: ulcer, ulceroglandular, typhoidal, meningeal.  Dennis et al. JAMA. 2001; 285 (21): 2663-2673  www.cdc.gov/mmwr/preview/mmwrhtml/mm5109a1.htm
Diagnosis	Clinical suspicion. Toxin assay: serum, stool, gastric aspirate.	Clinical suspicion. Lab: ELISA, PCR, viral isolation.	Clinical suspicion. Lab: ELISA, PCR, viral isolation.	Clinical suspicion. Lab: ELISA, PCR, viral isolation.	Confirmed final Dx and antibiotic sen-sitivities can take several days. Call Microlab STAT for gram stain and culture (at both 28 and 37 degrees) of sputum and blood. Request PCR and fluorescent Ab test STAT.	Nasal culture is Epi test only: never rules out infection. Draw blood cultures before antibiotics; will turn positive in < 24 hrs. Gram stain and culture, IHC, and PCR. CXR & CT (non-contrast optimal): widened mediastinum and bloody pleural effusions. Jernigan et al. Emerg Infect Dis. 2001; 7: 933-944	Clinical suspicion: If rash on face, then look for rash on palms. If present, airborne isolation and masks immediately. Main DDx: chicken pox or drug rxn. Use CDC rash algorithm. Lab: Need Biosafety Level 4 at CDC. PCR, Culture, Electron Microscopy.	Clinical suspicion. Lab: Gram stain & culture (blood, sputum). Direct Fluorescent Antibody (DFA), ELISA, PCR. CXR: broncho-pneumonia, pleural effusion, adenopathy.
Prophylaxis/Vaccines	None commercially available. Investigational (IND) multivalent vaccines under study.	None. Vaccine in development. Monitor all contacts for fever/bleeding for 21 days.	None. Vaccine in development. Monitor all contacts for fever/bleeding for 21 days.	None. Monitor all contacts for fever/bleeding for 21 days.	Postexposure Setting (Adults): Doxy-cycline 100 mg po q 12 or Ciprofloxacin 500 mg po q 12. Chloramphenicol 25 mg/kg po 4 x daily. Rx: 7 days. Consensus statement of the Working Group on Civilian Biodefense. Oral Rx if no sx; IV Rx if fever or cough in contacts. Inglesby et al. JAMA. 2000; 283 (17): 2281-2290 Vaccine: None. Use MASKS.	If sensitive: Postexposure (Adults): Ciprofloxacin 500 mg po q 12 or Doxycycline 100 mg po q 12. (For special situations: Amoxicillin 500 mg po q 8). All drugs at least 60 days. (Option in 2001 for drugs up to 100 days +/- postexposure vaccination with 3 doses of FDA-licensed vaccine under (IND) protocol at 0, 2, 4 weeks).	Vaccination with bifurcated needle 3-4 days after exposure offers protection. Vaccinia can spread to "contacts".   DA Henderson et al. JAMA. 1999; 281 (22): 2127-2137	Postexposure (Adults): Doxycycline 100 mg po q 12 or Ciprofloxacin 500 mg po q 12 all therapy x 14 days Consensus statement of the Working Group on Civilian Biodefense Dennis et al. JAMA. 2001; 285 (21): 2663-2673 Vaccine: none.
Therapy	ICU and supportive care. Elevate head of bed 20%. Aspiration precautions. CDC trivalent (toxin types A, B, E) equine antitoxin: 10 ml vial diluted 1:10 in 0.9% saline with slow infusion. No primary role for antibiotics.	ICU and supportive care.	ICU and supportive care.	Ribavirin 30 mg/kg IV x 1 (maximum, 2 g) then 16 mg/kg IV q 6 x 4 days then 8 mg/kg q 8 x 6 days. Side ef-fects: Hemolytic anemia, neuropsy-chiatric changes. JAMA. 2002; 287 (18): 2391-2405	Contained Setting (Adults): Strepto-mycin 1gm IM q 12 or Gentamicin 5 mg/kg IM/IV q D or 2 mg/kg loading dose then 1.7 mg/kg IM/IV q 8. All therapy x 10 days Inglesby et al. JAMA. 2000; 283 (17): 2281-2290 Mass Casualty Setting (Adults): Doxycycline 100 mg po q 12 or Ciprofloxacin 500 mg po q 12 or Chloramphenicol 25 mg/kg IV q 6. Rx x 10 days JAMA. 2000; 283 (17): 2281-2290	Inhalational (Adults): Ciprofloxacin 400 mg IV q 12 or Doxycycline 100 mg IV q 12 and 1-2 of the following: Clindamycin, Penicillin, Rifampin, Vancomycin, Imipenem, Chloramphenicol. All therapy x 60 days. Cutaneous (Adults): Ciprofloxacin 500 mg po q 12 or Doxycycline 100 mg po q 12. All therapy x 60 days due to risk of inhalational anthrax. CDC. MMWR. 2001; 50: 909-919	Supportive Care. Vaccinia Immunoglobulin (VIG) is not used for smallpox (variola). VIG is useful for some (but not all) serious vaccine (Vaccinia) reactions such as eczema vaccinatoum and progressive vaccinia. Cidofovir, an antiviral drug, may be offered under an FDA Investgational New Drug (IND) protocol for smallpox and serious vaccine reactions.	Contained Setting (Adult): Strepto-mycin 1 gm IM q 12 or Gentamicin 5 mg/kg IM/IV qD x 10 days. Alterna-tive: Doxycycline 100 mg IV q 12, or Chloramphenicol 15 mg/kg IV q 6 x 14-21 days, or Cipro 400 mg IV q 12 x 10 days. Mass Casualty Setting (Adults): Doxycycline 100 mg po q 12 or Ciprofloxacin 500 mg po q 12 x 14 days.